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29 March 1974

MEMORANDUM FOR: Mr. Rauer H. Meyer
Director
Office of Export Administration
Bureau of International Commerce
Department of Commerce

SUBJECT : Data Transmission and PCM Equipment
in the USSR and Eastern Europe

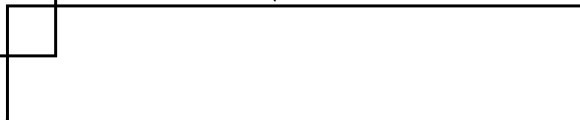
1. Attached are copies of two studies concerning the availability of data transmission systems (Attachment A) and pulse-code modulation equipment (Attachment B) in the USSR and Eastern Europe. Copies are included for your retention and for each member of the Technical Advisory Committee on Communications.

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2. Questions may be directed to [redacted] who prepared the attachments.

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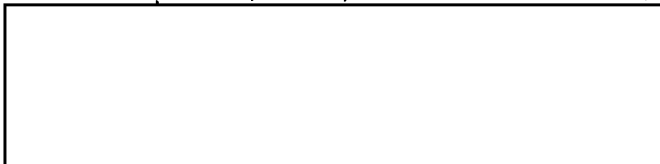
Office of Economic Research

Attachments:
as stated

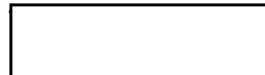
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ATTACHMENT A

Data Transmission in the USSR

Summary

1. Information on data transmission in the USSR, although scarce and sometimes ambiguous, indicates that data transmission is not in wide use, and that systems are just being developed, mainly for use in the existing telex network. Systems under development for use with telex will operate at a relatively low speed of 200-baud.

2. Data transmission will be used in the telex network, rather than in the telephone network, for the foreseeable future. That is because the telephone system currently is inadequate for high-speed data transfer owing to the prevalence of step-by-step exchanges. However, the use of the telex network could be troublesome. Although much of the existing telex system is suitable for data transmission at speeds of up to 200-baud,* by admission of Soviet officials, it has limited capacity, is nearly saturated, and is difficult to expand.

3. Soviet needs for data transmission equipment will not be satisfied during the current (Ninth) Five Year Plan period (1971-75) and possibly not for several years thereafter. The Soviet Minister of Communications has stated that even if current goals are met, there still will be a gap between the demand for data transmission facilities and the ability of the Ministry of Communications to fill that gap.

Current Soviet Capability

4. There is evidence that some relatively slow speed data transmission systems are in use in the USSR, but that high speed systems (1200 baud and above) are not in use and have not been perfected as yet.

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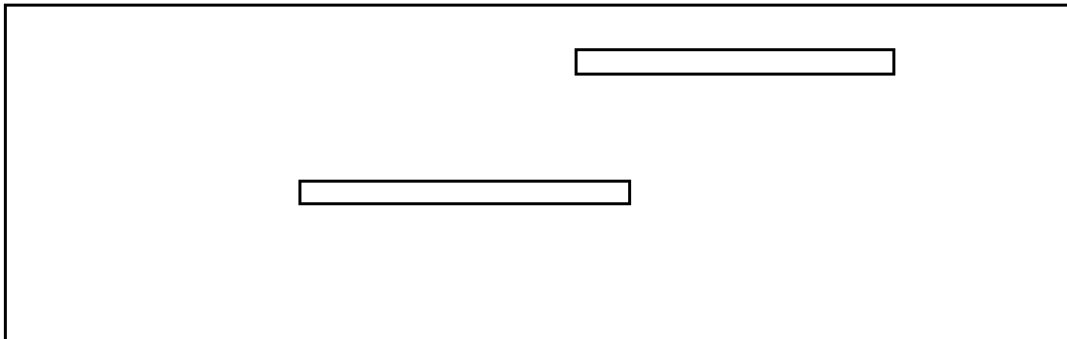
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Planned Data Transmission System

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X1 [redacted] several articles have appeared in the Soviet press describing Soviet plans for data transmission. In the long run the USSR plans to establish a unified automated communications network (EASS) that will unite all communications systems in the USSR into a single system using standardized equipment. According to Psurtsev, Minister of Communications, a major component of the EASS will be the All-Union System for Data Transmission (OGSPD); it will provide low and high-speed, switched and non-switched, data transmission channels.

6. Preliminary construction of the data transmission network is planned for the current Plan period. Initially, the Soviets plan to install 200-baud data transmission terminal equipment in the telex network for use with existing telegraph equipment. This is to be followed by the creation of new switching "centers" in the telex network and the installation in those centers of automatic switching exchanges capable of handling speeds of up to 200-baud. In "large centers" (probably republic capitals) AT-PS-PD exchanges (AT=subscriber telegraph, PS=direct connection, and PD=data transmission) will be installed; in smaller oblast centers crossbar PTS-K substations

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will be used.* In addition, multiplexing equipment, terminal devices, metering and monitoring devices, and related equipment will be supplied by producers in the USSR, Hungary, Bulgaria and East Germany.

7. Little is known about the availability or deployment of 200-baud data transmission equipment, or about the status of the switching centers. An article in the October 1973 issue of ELEKTROSVYAZ, suggests that the data transmission equipment, as of that date, was not available and indicated that "a number of organizational and rate problems" presumably associated with the setting up of data transmission terminals in the telex network, were still unresolved.

8. Some progress has been made in developing equipment for the new switching centers. Reportedly, the AT-PS-PD has been jointly developed by the Kiev Branch of the Central Scientific Research Institute of Communications and the Riga State Electrical Engineering Plant. The Soviet Minister of Communications, in an apparent reference to this equipment, stated in 1972 that it was undergoing testing at the Riga plant and that series production was to begin in 1972. It is not known if any of these systems have been installed as yet. Concerning the related terminal equipment, the ELEKTROSVYAZ article state that "All engineering problems have been solved and the major part of the equipment is in series production." It was stated further that the first 200-baud channels would be established on 80 main lines by the end of 1973.

Soviet Telephone Network -- Impediment to High-Speed Data Transmission

9. In the next few years the Soviets hope to develop 600- and 1200-baud, data transmission systems for use over telephone lines. Eventually, the Soviets envision systems with speeds ranging up to 48,000-baud. Implementation of these goals,

* The AT-PS-PD exchange provides 1000 lines each for four types of users: (1) terminal telegraph stations, (2) telegraph stations operating at speeds of 50-baud, (3) data transmission terminals at 100-baud, and (4) data transmission terminals at 200-baud. The PTS-K crossbar substation is described as having a capacity of up to 160 terminal lines and six long distance 200-baud channels.

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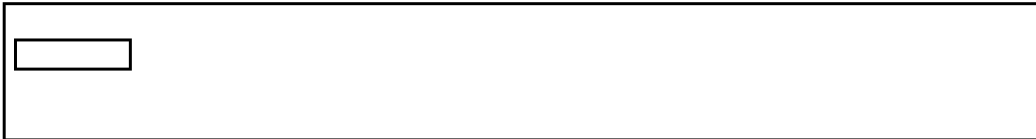
however, is far in the future and will need to be preceded by the reconstruction of the existing telephone network on a modern base.

"The change to higher speeds involves . . . equipping (long distance and city telephone networks) with modern transmitting apparatus with higher reliability, and automating the network by replacing the step-by-step system everywhere."*

10. According to the views of several Soviet experts published in the press, a data transmission network using telephone lines cannot, at present, achieve required rates of accuracy at 600-, 1200-baud, because of the poor condition of installed equipment and the widespread use of step-by-step switching.

"Since all toll switching, and over 90% of local telephone switching, is based on decade-step instruments, there is at present no possibility of organizing a DT (data transmission) network of the necessary quality over switched telephone channels."**

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Equipment Under Development

12. A variety of equipment related to data transmission has been mentioned in Soviet articles but, with few exceptions, rarely described in detail.

* JPRS 60733, 10 December 1973, pp. 2-3, "Telegraph, Teletype, and Photocopy Developments Discussed" by S. I. Martsenitsen, translated from Elektrosvyaz, No. 10, 1973, pp. 1-7.

** Telecommunications and Radio Engineering, August 1971, "Types of Structure for a Switched Data Transmission Network" by L. I. Yaroslavskiy, I. S. Usov, and A. I. Shtul'man, p. 17.

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AKKORD-1200PP. Mentioned in 1971, this equipment is designed to work through switched and leased telephone channels at a speed of 600- or 1200-baud. No information on production is available. However, in August 1972, the Soviet Minister of Communications stated that a line of devices under the general name AKKORD, with the capability of transmitting "300 digits per second" had gone into series production.

STROITEL'. Said to have been developed in 1971 and described as a data transmission apparatus capable of 50-75 baud speeds.

APD-1M and APD-3M. Development of the APD-1M and APD-3M data transmission equipments by the Institute of Technical Cybernetics of the Belorussian Academy of Sciences was announced in 1973. These equipments were said to be capable of 50-600 bauds over switched lines and up to 2400-bauds over leased lines. It was not stated when series production was scheduled to begin.

URAL. Described in 1973, this equipment is said to provide a duplex data transmission channel capable of speeds of up to 200-baud over city telephone networks. It was developed by the Odessa affiliate of the Central Design Bureau of the Ministry of Communications. No information on expected serial production or deployment dates was given.

Unidentified 200-BAUD System. A 200-baud DT system for use with the IKM-12M PCM multiplexing equipment was mentioned in 1973. The data transmission equipment, as well as the IKM-12M, were said to have begun series production in 1973.

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ATTACHMENT BProduction and Availability of PCM Systems in the
USSR and Eastern Europe

The USSR and several countries in Eastern Europe apparently have, or soon will have, at least a limited capability to produce low capacity PCM systems. One country -- Poland -- will soon be producing 30-channel PCM systems under license from France. It seems clear that none of these countries has the capability to produce PCM systems with greater than 32-channel capacity, although 120-channel systems are under development.

USSR:

The USSR claims to be producing a 12-channel PCM multiplexer for rural networks. In 1969 it was reported in the Soviet press that 24-and 32-channel PCM systems would undergo test trials in 1972, and that 120-channel equipment was under development. However, since that report, the USSR has mentioned in open literature only its 12-channel PCM equipment suggesting that higher capacity PCM equipment has not been perfected yet.

Czechoslovakia:

The Czech firm Tesla claims to have developed a 24-channel PCM multiplexer the KPK-24 which was "introduced" into the Czech telecommunications network in 1970. Also, a 32-channel PCM unit, the KPK-32, was reportedly undergoing field testing in 1969 and 1970. According to Tesla, a 120-channel experimental multiplexing system, which combined four KPK-32 basic groups, was built in early 1971. No additional information is available on production, deployment, or quality of these systems.

East Germany:

East Germany has developed a 30-channel PCM multiplexer, the PCM 30/32. This system has been offered for sale to Greece and currently is undergoing tests in Greece. It cannot be determined if the system exists in prototype only or actually is in production. The sales offer to Greece may be an effort to determine if the equipment is of sufficient

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quality to sell in Western markets.*

Hungary:

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The Hungarian Research Institute for Telecommunications (TKI) has developed a 30-channel PCM multiplexer, the BD 30/32. Hungary has offered to sell this system to a US firm for 1975 delivery. Output is said to be fully committed for 1974.

Poland:

Reportedly, Poland will produce 30-channel PCM using French technology at some unspecified future date. It has been reported also in open literature that Poland has a 24-channel system under development and expects to begin production in mid-1974. However, it is not known whether this equipment will be produced on the basis of foreign or domestic technology. Higher capacity systems -- 120- to 480-channels -- are said to be under development.

Although the arrangements with France are not entirely clear, it appears that Poland plans to produce at least 400 30-channel PCM "transmission" systems at a plant in Poznan that will be equipped by France. These systems will be used as "line concentrators" in French-designed electronic switching systems that apparently also will be built at the Poznan plant.

* Since 1971, East Germany has followed a policy of requiring new products to prove their salability in Western markets.

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